



Revision of claims requested by USPTO and Mr. Dirk Wight, Examiner. 2/15/05

As recommended, Mr. Regner reworded all the claims and eliminated revering to figure numbers except for the *new drawings Figures 1.12, 1.13, 1.14*; this was necessary, because the cyclo pressure angle definition is rather different from that of spur gear pressure angles: the cyclo pressure angle changes from an outside to an inside cylindrical radius line contact. In contrast to the spur gears pressure angle, they have an outside changing radius and are defined as involute or curled.

The cyclo characteristic is more comprehensive as shown in the drawings Fig. 1.12, 1.13, and 1.14; here two more cyclo ration changes are shown, but that was previous not well defined. Also the drawings under Fig. 1.11 were added to identify the flexible range of the cyclo gear geometry that took centuries to find acceptance in the world of power transmission, per Mr. Braren, he inventor of today's basic cyclo gear in 1930; but 75 years later, there is still room for real advancement.

Here the cyclo module is direct related to the roll diameter and the eccentrics. It is impractical to separate the claims from the cyclo features. Consequently, here some claim numbers were removed and every claim was restated, and the original meaning was preserved and rewritten and redrawn more clearly and to the point of this patent.

Mr. Regner invented the three disk cyclo from the two disk cyclo in 1983 to 1986 during his employment with General Motors. But already in 1952 in Germany, Regner incorporated the supporting bearing between the outer gear and the side flange to center the wave disk and cam shaft to each other for a controlled cycling. Later in the USA, Regner was temporary reassigned in 1981 to GMF Robotics, a venture company by General Motors and Fanuc Ltd. of Japan. During that time he was repeated asked to join the new firm and sign the Atwill and patent assignment form. He refused do this because the company management took previous patents from Regner and for that and in addition General Motors employee terrorizes Regner with dead threats. Also Regner previously had signed with GM those forms with the stimulation that he will receive 13% of the net earnings of any patent he shell develop and the form contract was filed with the personnel office of GM's Technical Center in Warren, Michigan, at his employment starting date and when Regner received his assigned patent work log book. During his employment with this car builder he documented and had witnessed all his patent work. The log book was, under protest, confiscated by Steven Walsh, manager and Hadi A. Akeel Ph.D. V.P. from GMF Robotics on July 18. 1986.

But what did they do for instance to Regner? Eric Mittelstadt, chairmen of GMF Robotics and the Sales director of Fanuc Ltd. Japan, Hatshimodo, both are member of the board of Fanuc and GMF Robotics had fired to kill, discharged, a rifle at Regner and creased his nose and smashed the windshield of the taxi in Japan while he was being driven from Hino to the Airport Tokyo Station; and prior that in Hino at

the Fanuc headquarter and hotel, Japan, they kidnapped and starved and dehydrated Regner for five days until Regner passed out, then Fanuc let him go to shoot him, but he escaped. And at GM, coworkers run a knife into Regner's right arm here in Michigan, because he designed a whole new, leading edge, air-pressurized electrical robot painter system and Regner insisted that he was the inventor and not his superiors and coworkers, there were about 250 GM Americans, members of the NC-Robot Painter department who based their design on hydraulic power and worried about losing their jobs because of Regner's advanced robot design. Company and police criminal incidents reports were made but without any worthwhile results. The city police here in Troy, Warren and Roseville, Michigan, declared: the USA is an uncivilized country and you need to get yourself a gun, we can not protect you from your neighbors or coworker or bosses or whomever. Have them kill you or kill them so we have something to work with – or better go home where you came from, the USA is not like orderly civilized Germany! Thank you for clearing that matter, police.

The patent most closely related here to the described crime is 4,909,102. Regner had asked Sumitomo USA to build for GMF-robotics a three disk cyclo gear that fits into the Fanuc robots. The original robot performance was charted and documented, but the revised cyclo was not charted, because Regner was fired within two minutes of testing the new cyclo robot. The new cyclo had visibly improved the robot performance. Regner had provided the privileged and secured and signed patent and engineering information to Sumitomo USA and to GMF Robotics management. The patent was taken from Regner by the company's patent attorney and management and he was fired from the company and black listed in the USA. In addition, they, the company management, falsified Regner's signature on the employment ATWILL form and filed it without the 13% earnings stimulation. The word ATWILL had Regner crossed out and voided. GM Corp. and Fanuc Ltd. also the Michigan State and Troy city lawyers cooperated with the international criminals.

Mr. Dirk Wright, the assigned patent examiner, asked Regner repeatedly to have a patent attorney finish this patent application. How can Mr. Regner trust official attorneys, judges and lawyers with his experiences on his inventions with the following patents: 4,402,234; 4,708,580; 4,909,102; 5,421,218 and USDC Case No. 00-74093. The patents were taken from him by trusted company attorneys and God fearing and law abiding Americans. Many Americans do not respect others' civil rights and sovereignty, and therefore do not respect their own laws; a plausible historic situation of the ongoing runaway Anglo-Saxon - American imperialism. But now we have to finish this patent, please, it is a patent and nothing less or more; but please do it before mad reborn nationalists take it and do something worse than one can imagine, and those witless leaders declare again after killing: it is the right thing to do - this is the new twenty-first century Crusade; here it is really only great inventing - and a small number of scientists, engineers and people love to do these kinds of work. Contrary to educated MBA's from Harvard and other Institutions who declared previously: inventing is unproductive and it is easier to take technology from smaller countries that have more intellectual stamina and pride on hand as we have in the USA. Yes, the Chinese and Indians do not think so and do confirm it with the trade deficit the US has with them year

after year, and likewise the Japanese and Germans, Canadians and Mexicans; those so-called second and third class industrial counties, per US self-promotional standards, oddly, those peoples also love their own country, patents and accomplishments and do not appropriate it the Harvard USA and General Motors Institute's way, they honestly earn it and so does Mr. Regner, a naturalized U.S. citizen.]

## **“ALTERED AND MARKED TEXT”**

~~I-claim:~~

**What is claimed is:**

~~1. A geometrical design arrangement for planet type roller gear. The basic geometrical relationship of the "cyclo module" to the cyclo housing/roller cage, the cyclo wave disk, and the cam/eccentric dimensions. These geometrical design relations and the realized simplifications are the basic features of these inventions.~~

1. [001, restated paragraph] A geometric design-to-build system for planet-type, backlash-free, roller-cyclo-gears and torque multiplier with the herewith patented key term “cyclo module” (similar to circular module for spur gears) which is identified by the letter “R” and stands for “the radius of the cyclo cylinder-like rounded tooth”(2); following are interrelated claims such as gear housing with utility channel throughputs; back drivable gears with low pressure angles that allow a high torque efficient power transmission with sealed-in lubricant; a constantly powered backlash-free rotary encoder; and one add-on anti-hunting electronic circuit that improves positioning and durability of the cyclo gear axis.

~~2. A geometrical design arrangement for planet type roller gear according to claim 1 wherein: the roller cage has the given relation to the cyclo module as shown in figure 1.~~

2. [002, rephrased paragraph] A cyclo module which represents one-half the theoretical diameter of the cyclo roller tooth (3.3) across its center: the individual roll tooth centers precisely locate at the theoretical cyclo planet wave disk roll diameter (2, 3.2) and at the cyclo gear roll diameter (1, 3.1) and identified as “D2” and “D1”.

~~3. A geometrical design arrangement for planet type roller gears to claim 2: wherein the roller size has a geometrical relation to the cyclo module as indicated under figure 1.~~

3. [003, rearranged text] A cyclo wave tooth cap radius “r” (defined by three tangent points - two points are at adjacent roller tooth radii “R” and the third tangent point is at the precise theoretical roll diameter “D2” of the cyclo disk (2, 3.2)), is an important radius that influences the low gear pressure angle (8 to 19 degrees identified in Fig. 1.12, 1.13, 1.14), and impact the tooth strength, and is an important characteristics of this patented design.

~~4. A geometrical design arrangement for planet type roller gears according to claim 3: wherein the eccentric has a geometrical relation to the cyclo module and claim 3.~~

4. [004, repositioned paragraph] The pinion's eccentric's (3, 3.3) OFFSET is designated with "O" equals ( $\frac{1}{2}$  "R") and the offset: determines the engagement depth of the cyclo wave disks (2, 3.2) to the cyclo gear (1, 3.1); controls the smooth, simultaneous constant rolling engagement of the 3 disks 720 degrees total cyclo teeth engagement; and secures a smooth, balanced and staple power torque transition.

~~5. A geometrical design arrangement for planet type roller gear according to claim 4:~~

~~wherein the wave disk has a geometrical relation to claim 1-4.~~

5. [005, rearranged & position] The cyclo planet wave disk (2, 3.2) has: one less external roller tooth than the associated internal tooth cyclo gear (1, 3.1 and Fig.1.12, 1.13, 1.14); a theoretical design roll diameters derived by multiplying the standard cyclo module dimension "R" by the number of roll teeth designated here with Z1 and Z2; a transmission gear ration defined as revolutions IN to OUT and is defined as the number of cyclo gear teeth divided by minus one ( $I = Z1 / (Z2 - Z1) = Z1 / -1$ ); samples of cyclo gear are shown with the lowest workable number of teeth, is Z=3 and an arbitrary number, is Z=61, as in Fig.1.11 and table 3; a range of cyclo modules and gear application have been sited: from hydraulic pumps and actuators; steam, gas, pneumatic powered rotary motors and compressors/superchargers, etc.

~~6. A geometrical design arrangement for planet type roller gears according to claim 5: wherein three eccentrics are spaced equally between the center and the roller eage as shown in drawings figure 3 and 4.~~

6. [006, replaced text] Three 120 degree maximum equally spaced eccentric drive pinions (3) are fitted with bearings into the opposing side flanges (4, 5); three backlash free planet gears (8) are mounted to the pinion (7) and are driven by the motor driveshaft sun gear; three wave disk (2) are press fitted with frictionless bearings that roll on the eccentrics and transfer their rotation torque to the cyclo gear; pinions transfer the high torque to the side mounted flanges (4, 5); this design cyclo gear arrangement is backlash free and produces precision accuracy.

~~7. A geometrical design arrangement for planet type roller gears according to claim 6: wherein the number of cams is not limited to 1, 2, or 3, The Size of the cyclo assembly and cost will determine if more than three cams are practical.~~

7. [007, repositioned and rephrased] The cyclo equipped with three narrow equally-spaced cyclo disks are immune to dynamic load vector changes and harmonic vibrations, unlike wider one-disk or two-disk cyclo gears where the engaging variable gear teeth friction induces vibration which is worsened by either reacting dynamic vector load shifts or by relatively wide roll gear teeth spacing, and consequently flatter, larger contact angles.

~~8. A geometrical design arrangement for planet type roller gears according to claim 7: wherein the cams are spaced to drive out the high torque generated by the cyclo gears wave disk(s) in connection to the cam(s).~~

8. [008, rephrased] The cyclo gear (1) is: mounted on bearings (10) between two opposing drive-out flanges (4, 5); kept in place by three incorporated large hollow, equally-distant stand-up spacers (4) and driven by three flange-to-flange reaching pinions (3) with eccentrics' and pinion gears (7), and are utilized to transfer the cyclo high torque rotation to the flanges (4, 5); self-contained is the lubrication sealed-in (15), backlash free, high torque cyclo gear axis or turn table with pass-through openings (3, 4, 9) for utility and encoder intelligence transmission cables, and the large center hole (9) is well placed for additional coaxial drive shafts throughputs.

~~9. A geometrical design arrangement for planet type roller gears according to claim 8: wherein the two drive out flanges are driven by the cams by play free bearings (figure 3, 4).~~

9. [009, repositioned text] One cyclo gear system with the following: only one center pinion on fitted bearings with three eccentrics (3.4); three press fitted needle bearings in the wave disks (3.2) which roll on the eccentrics that engage them with the cyclo gear (3.1); six or more equally maximum spaced and sized hollow torque stabilizing pins (3.5), fitted with frictionless nano magnetic-liquid-lubed sleeves and mounted between two opposing flanges (3,12) which transfer backlash free, the high torque to the tightly fitted and lubricated-sealed-in drive-out flanges (3.12), and the hollow stabilizing pins make it possible that auxiliary drive shafts, communication and power contactors are routed conveniently through the cyclo axis or turntable.

~~10. A geometrical design arrangement for planet type roller gears according to claim 9: wherein flange and housing bearings form a unit axes cyclo gear assembly (Figure 3, 4, 5).~~

10. [010, repositioned text] A pair of deep groove ball bearings or cross-roller bearings (10) are utilized to stabilize the high torque flanges to the cyclo gears by way of reset shoulder fits and retainers to make the cyclo gear assembly a stable axis or turntable for use in robots or other machine tools, in addition the flanges are equipped with fasteners and threaded attachment and index holes to make them align and attachable to other machines, fixture, and bases.

~~11. A geometrical design arrangement for planet type roller gears according to claim 10: wherein a multitude of rods (torque, stabilizing bars), hallow or solid, stabilize and rigidities the two drive out flanges as shown in figures 3,4,5. to a coherent gear driven axis assembly.~~

11. [011, rearranged text] Included here and integral to the design are cyclo gear bodies made of soft metals or plastics that have inserted bearings and hardened cyclo

teeth rollers (3.3), and cylindrical bushings, also offset-pins are fitted into cylindrical grooves or shouldered cylinder holes to distribute the high gear contact loads.

~~12. A geometrical design arrangement for planet type roller gears according to claim 11: wherein a single or pair of deep groove or a cross roller bearing is used to stabilize the high torque flange to the gear housing, as in Figure 2, to make the gear assembly an axis or turntable.~~

12. [012, repositioned text] To enhance the cyclo rotating positioning accuracy further, an absolute constantly powered two-channel angular shaft encoder is fitted to the cyclo gear drive pinion or servo motor to make it an absolute position smart cyclo axis, which is connected to a constantly powered up-down counter that knows at any time its position, and does not lose its calibration data even on machine power off, whose data is constantly accessible by controllers or computers, and, if necessary, by internet or satellite anywhere in the world or universe.

~~13. A geometrical design arrangement for planet type roller gears according to claim 12: wherein all hollow cyclo rollers are securely positioned with pins to the roller cage as shown in figure 1-5.~~

13. [013, cut and rearranged text] A anti-hunting servo signal filter that enhances the performance of the cyclo torque multiplier and cyclo gear axis; it reduces and eliminates unwanted oscillating cyclic motion and consequently unwanted wear; however, susceptible to vibration are cyclo gears with one and two wave disks and cantilevered torque transfer output pins, also large cyclo tooth spacing with large pressure angles increase vibration and consequently wear; but vibration is made worse by amplified feedback summing circuit signals, as observed and as documented; in all this circumstances of shortcomings the anti-hunting circuit is doing an exemplary filter job and reduces vibration and wear and is an important claim to this patent.

~~14. A geometrical design arrangement for planet type roller gears according to claim 1 to 13: wherein position accuracy by the use of the cyclo gear assembly is further enhanced by controlling its position. To know the rotation position at any time by adding an absolute shaft encoder to the gear axis drive in or drive out, depending on the use of the cyclo gear drive/axis, as shown on figure 6. This is a very important and useful feature and a very worthwhile claim.~~

~~15. A geometrical design arrangement for planet type roller gears according to claim 14: wherein the absolute angular encoder, consisting of a permanently battery power backed "On" encoder up/down counter with accessible shift register / memory is added as shown in Figure 5.~~

~~16. A geometrical design arrangement for planet type roller gears according to claim 15: wherein the analog summing circuits and feed back servo circuit often feeds back data misdirecting the summing results and therefore the servo action. The figure 7 frequency and servo filter counteracts irrelevant signals and enhances further the productivity and performance of the cyclo torque multiplier and cyclo gear axis.~~